

Foreword



National
Oceanic and
Atmospheric
Administration



U.S.
DEPARTMENT
OF
COMMERCE

NOAA Fisheries Service Northeast Cooperative Research Partners Program

The National Marine Fisheries Service (NOAA Fisheries Service), Northeast Cooperative Research Partners Program (NCRPP) was initiated in 1999. The goals of this program are to enhance the data upon which fishery management decisions are made as well as to improve communication and collaboration among commercial fishery participants, scientists and fishery managers. NOAA Fisheries Service works in close collaboration with the New England Fishery Management Council's Research Steering Committee to set research priorities to meet management information needs.

Fishery management is, by nature, a multiple year endeavor which requires a time series of fishery dependent and independent information. Additionally, there are needs for immediate short-term biological, oceanographic, social, economic and habitat information to help resolve fishery management issues. Thus, the program established two avenues to pursue cooperative research through longer and short-term projects. First, short-term research projects are funded annually through competitive contracts. Second, three longer-term collaborative research projects were developed. These projects include: 1) a pilot study fleet (fishery dependent data); 2) a pilot industry based survey (fishery independent data); and 3) groundfish tagging (stock structure, movements and mixing, and biological data).

First, a number of short-term research projects have been developed to work primarily on commercial fishing gear modifications, improve selectivity of catch on directed species, reduce bycatch, and study habitat reactions to mobile and fixed fishing gear.

Second, two cooperative research fleets have been established to collect detailed fishery dependent and independent information from commercial fishing vessels. The original concept, developed by the Canadians, referred to these as "sentinel fleets". In the New England groundfish setting it is more appropriate to consider two industry research fleets. A pilot industry-based survey fleet (fishery independent) and a pilot commercial study fleet (fishery dependent) have been developed.

Additionally, extensive tagging programs are being conducted on a number of groundfish species to collect information on migrations and movements of fish, identify localized or subregional stocks, and collect biological and demographic information on these species.

For further information on the Cooperative Research Partners Programs please contact:

National Marine Fisheries Service (NOAA Fisheries Service)
Northeast Cooperative Research Partners Program

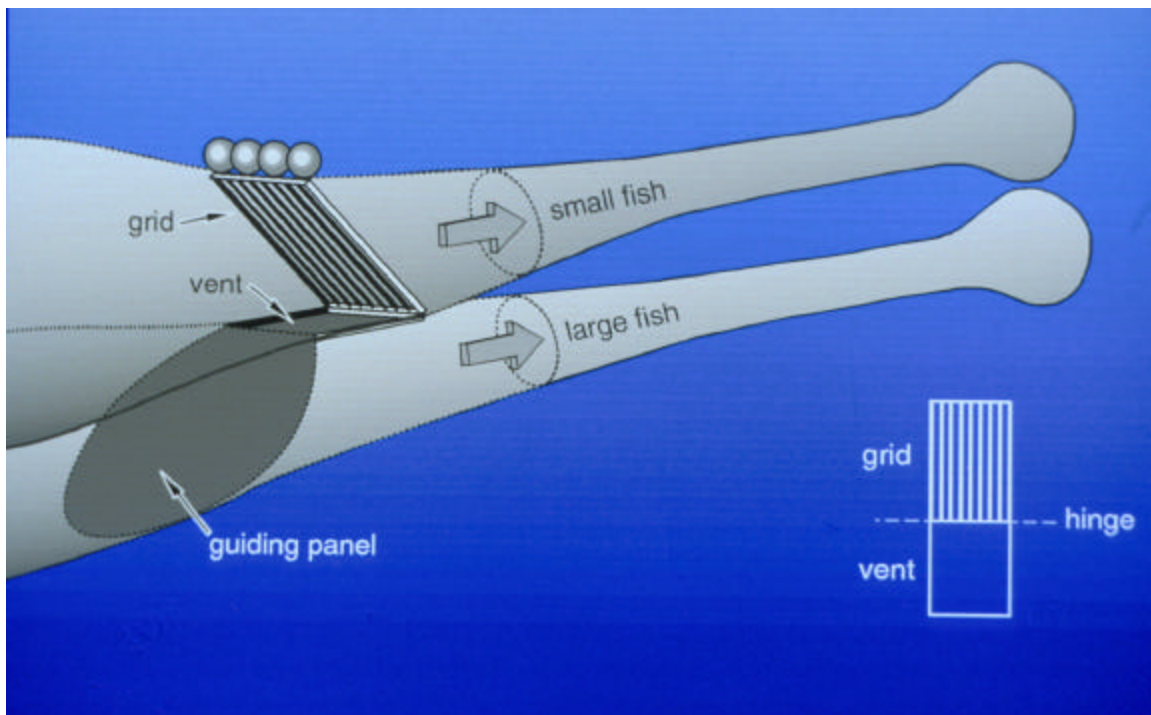
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www.nero.noaa.gov/StateFedOff/coopresearch/

Final Report

Proceedings of a series of port meetings with the
fishing industry (New England 2001)

Bycatch, Discard & Conservation Engineering Issues



Submitted February 26, 2002



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To

NOAA/NMFS Cooperative Research Partners Program
Northeast Region
&
New England Fisheries Management Council, Research Steering Committee

Prepared by Dr. Christopher Glass
Manomet Center for Conservation Sciences



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Executive Summary

Manomet Center for Conservation Sciences (MCCS) was commissioned by the National Marine Fisheries Service, N.E. Region's Cooperative Research Partners Program to conduct a series of day-long workshops with the fishing industry in early 2001 to discuss issues relating to bycatch, discard and conservation engineering strategies.

The specific aims of this series of meetings were; to discuss and document issues of concern to fishermen of the New England Region with respect to bycatch, discard and conservation engineering technologies; to bring fishermen's unique experience and expertise more directly into the science and management framework; to help develop partnerships between fishermen, scientists and managers; to encourage commercial fishermen/vessels to participate in cooperative research and development of selective gear technologies; and perhaps most importantly, to help set local and regional research priorities aimed at mitigating bycatch and discard and improving selectivity of fishing gears.

A total of 10 meetings were held in Ellsworth ME, Rockland ME, Portland ME, Portsmouth NH, Gloucester MA, Plymouth MA, New Bedford MA, Hyannis MA, Point Judith, RI and Montauk NY. A meeting scheduled for Connecticut was held concurrently with the meeting in Rhode Island.

Despite extension and widespread advertising, meetings were in general poorly attended. This may have been due to the large number of meetings that were scheduled for late 2000 – early 2001 but may also reflect the fact that many in the industry feel a sense of disillusionment with current management practices and institutions. However, despite the low attendance, meetings were highly productive. It is unlikely that any additional issues would have been identified with higher attendance by fishermen.

Although each port identified problems or concerns specific to that area, there was a remarkable consistency across all ports in the issues and concerns expressed.

In general there was a great deal of frustration with fisheries management both at the Council level and with NMFS. This general disillusionment had a tendency to be expressed at every stage of meetings and had the effect of deflecting energy and attention from the main agenda items. However, it seems there was a clear need for these views to be expressed and documented.

Some participants explored creative approaches to specific issues but in general there was a surprising lack of futuristic thinking. One of the major aims of this series of scoping meetings was to encourage commercial fishermen/vessels to identify particular issues and concerns and to use the forum as a platform to develop ideas and explore potential solutions. The final step was to seek scientists and/or Institutions to partner with. However, a common and disappointing theme was the suggestion that what the industry needed was for the scientific community to identify a problem and to approach the fishing industry to get the projects carried out. This seems to be at odds with the rationale and intent of the whole process of collaborative research. Perhaps once successful research projects that truly involve fishermen as equal partners are demonstrated widely this attitude will change but at the present time this prevalent attitude could be a major hurdle to effective use of appropriated funds. However,

fishermen by nature are uniquely creative and innovative. Lack of discussion on innovative bycatch reduction techniques may simply be a reflection of unwillingness to make a good idea common knowledge in advance of a competitive proposal process. The same could be said of the scientific community.

Stewardship and changing practices was another hot issue. Industry and fishermen at each meeting were very firmly of the opinion that fishermen should be acknowledged for all the efforts that they make on a daily basis. Fishermen do not want to discard fish so they move to a different area, or modify their gear, or don't fish at all. They also wanted to put on record that attitudes have changed and that there is a greater sense of stewardship now than ever before. Fishermen feel they actively protect the fish for the future and the days of just catching everything (if they ever existed) are long since gone.

A wide range of topics was discussed during the meetings. Each issue raised was considered sufficiently important to be raised in the first place. We have therefore avoided condensing issues or assessing priorities. We draw attention to the information in Tables 1 through 7 and the flipchart summary, as the true substance of this series of meetings. However, we have attempted to generate broad category recommendations that may be of use in setting research priorities. We believe the recommendations are supported by the general discussions.

The recommendations include;

- Improve monitoring of bycatch/discard levels
- Implement **coordinated** programs to address bycatch/discard in key fisheries
- Document reaction behavior of key species
- Address gear selectivity issues
- Implement studies to understand mortality of discards
- Develop outreach and education programs coordinated with bycatch reduction research programs

We further recommend that the lists of species and issues of concern outlined in the body of this report be addressed in a systematic manner.

Overall meetings were extremely productive. We hope this document will provide background material and tools for all those interested in making collaborative research a success. Furthermore it is our perception that the process has helped build bridges between some scientists, fishermen and managers and will undoubtedly help future research programs be more effective. Additionally, and perhaps more importantly, we believe the transcripts and audio recordings provide a remarkable snapshot of the thoughts, concerns, ideas, enthusiasm and philosophy of the fishing industry in the New England region. In time the transcripts may become a valuable document relating to the state the fishing industry in New England 2001.

NMFS and the NEFMC research steering committee deserve great credit for supporting and financing this program.

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Introduction

In early 2001, Manomet Center for Conservation Sciences (MCCS) was commissioned by The National Marine Fisheries Service (NMFS), to conduct a series of day-long workshops with the fishing industry to discuss issues relating to bycatch, discard and conservation engineering techniques. The background to and rationale for this series and other related meetings are laid out in the foreword.

The specific aims of this series of meetings were; to discuss and document issues of concern to fishermen of the New England Region with respect to bycatch, discard and conservation engineering technologies; to bring fishermen's unique experience and expertise more directly into the science and management framework; to help develop partnerships between fishermen, scientists and managers; to encourage commercial fishermen to participate in cooperative research and development of selective gear technologies; and perhaps most importantly, to help set local and regional research priorities aimed at mitigating bycatch and discard and improving selectivity of fishing gears.

Workshops were held in the following ports:

Point Judith RI (including CT)*	18 th January
Hyannis MA	22 nd January
Ellsworth ME	8 th February
Rockland ME	9 th February
Portsmouth NH	15 th February
Portland ME	16 th February
Gloucester MA	20 th February
New Bedford MA	22 nd February
Manomet MA	23 rd February
Montauk NY	9 th March

* A meeting was scheduled to be held in Connecticut but industry leaders from Connecticut requested the meeting in Rhode Island be a joint Connecticut/Rhode Island meeting.

The scoping meetings followed a common format in all locations. In general, the four broad categories of discussion were as follows;

- \$100k Challenge:
- Bycatch/Discard and Conservation Engineering Issues:
- "What works?":
- Program and project development:

\$100k Challenge

Prior to the first meeting, a press article featuring fisherman Luis Ribas of Provincetown MA appeared in a major local newspaper. Luis had been a recipient of a \$100,000 research grant (in conjunction with the Massachusetts Division of Marine Fisheries, MaDMF) to develop a trawl net capable of reducing bycatch and discard of cod. The newspaper article focused on many positive aspects of the work which included amongst other things, successful reduction of cod bycatch, true cooperative research in action, and a member of the fishing industry taking responsibility for improving fisheries in his local area. This seemed to encapsulate the true essence of collaborative research. Building on this example, each meeting was opened by posing the question; ***What is the key issue you would address in this region if you were the recipient of a \$100,000 research grant?*** This was designed to identify and document key local area concerns. Discussion was directed towards but not restricted to bycatch, discard and conservation engineering strategies.

Bycatch/Discard and Conservation Engineering Issues

As an introduction to discussion of bycatch and discard issues a brief presentation of global bycatch reduction initiatives, both current and historical, was given by Chris Glass of Manomet Center for Conservation Sciences. The aim was to stimulate creative thinking in terms of bycatch reduction strategies and to illustrate the type of methodology that might be applicable to fisheries within the New England region. An extensive bibliography relating to bycatch, discard and selective gear research is included in Appendix 3. It is hoped this will provide a resource to members of the fishing industry (and others) who are interested in developing cooperative research programs. Electronic copy can be made available on request.

“What works?”

Discussion of bycatch and discard issues has a tendency to focus on negative aspects of the subject. However, individual fishermen regularly change fishing practices, move to a different fishing area or modify gear in response to distributions of non-target species. Furthermore, many changes have been made in the region either on a voluntary basis or through direct management initiatives. Fishermen and industry representatives requested that a list of bycatch reduction devices and fishing practices that are or have been used within each area (What works) be documented. In general this proved to be the most active session at each meeting. A long list was produced at each meeting and included examples such as the Nordmore grate, raised footrope trawl, days at sea regulations, closed areas, pingers on gillnets, weak links on risers in trap fisheries and fishing for lower quantity of better quality product. See Appendix for other examples from each port. We have chosen not to list or tabulate all the examples here but acknowledge the many techniques, changes in practice and bycatch reduction devices in common use throughout the region.

Program and project development

Prioritization exercises

In addition to identifying key research projects and bycatch /gear concerns, participants at some meetings were asked to prioritize issues. Prioritization techniques varied from meeting to meeting but usually consisted of participants casting votes (by attaching colored adhesive dots) beside the issue of concern on the flipchart summary of the

meeting. The results of these prioritization exercises are documented in the Flipchart summaries (Appendix 1). The priorities reflect only the views of the meeting participants (many of whom were scientists and/or fisheries managers), not industry as a whole. The results of these exercises are included for completeness but should be viewed as exercises not as recommendations.

Proposal/project development

One of the major aims of this series of scoping meetings was to encourage commercial fishermen to participate in cooperative research and development of selective gear technologies. Meetings therefore also included a short session directed towards assessment of project priority levels, project development and proposal development. An exercise involving a 2x2 matrix analysis technique was used to demonstrate how topics of particular importance can be identified from a list of potential candidates. This technique can also be used to identify projects that, although important, may be too expensive or too difficult to achieve. Projects can be categorized into 4 separate categories based on cost/degree of difficulty and potential payoff. The categories can be defined as follows; low hanging fruit (easy to achieve and inexpensive but with low payoff); tough nut to crack (difficult and expensive with a high potential payoff – just do it); not worth the effort (difficult and expensive with little potential payoff); quick hit (easy and inexpensive to do with high payoff). Details and examples are included in the flipchart summaries (Appendix 1). As above, priorities identified by this technique reflect only the views of the meeting participants (many of whom were scientists and/or fisheries managers), not industry as a whole. The results of these exercises are included for completeness but should be viewed as exercises not as recommendations. The main aim of the exercise was to demonstrate how priorities may be identified and to provide a set of tools with which to set such priorities.

Meeting logistics

Meetings were advertised extensively in local area press, through New England Fisheries Council mailings, by personal invitation, through the registered dealer network, by posters and by word of mouth. Over 2,200 personal invitations were mailed to members of the fishing industry. In one port (Portsmouth, NH), meeting notifications were even included with fishermen's pay-checks prior to the meeting. In addition, a key member of the fishing industry was contracted in each port to act as a liaison officer both in terms of logistics and to help encourage support and attendance by local fishermen. A list of meeting participants is outlined in Appendix 2.

Despite the extensive and widespread advertising, meetings were in general less-well attended than anticipated. This may have been due to the large number of meetings that were scheduled for late 2000 – early 2001 but may also reflect the fact that many in the industry feel a sense of disillusionment with current management practices and institutions. However, despite the low attendance, meetings were highly productive. It is unlikely that any additional issues would have been identified with higher attendance by fishermen.

Pre-printed contact sheets were distributed at each meeting for industry representatives to re-distribute amongst fishermen in their home ports. These sheets allowed individuals who were either unable or unwilling to attend meetings to have their viewpoints recorded and documented. Comments recorded on returned forms are included in the flipchart summary (Appendix 1) of the appropriate port.

In order that a true and accurate record of proceedings was obtained, all meetings were recorded on audio-tape and subsequently transcribed. Full verbatim transcripts have been lodged with NMFS. The outcome of the discussions and issues raised at each meeting are summarized in Appendix 1.

The following narrative attempts to summarize the major issues raised and discussed in this series of meetings. Examination of Appendix 1 shows that each meeting provided a vast array of information on a wide range of topics. In the interest of providing an overview, this document does not address every specific issue or concern raised. However, we have attempted to capture the major common themes as well as drawing attention to local area concerns where they exist. **For a full understanding of the issues and concerns of the industry in New England, there is no substitute for complete examination of issues documented in Appendix 1.**

Editors Foreword

Many participants expressed concern that a series of meetings should be focused on bycatch and discard issues. The terms **bycatch** and **discard** were felt to have negative connotation. Industry representatives felt that bycatch and discard are in general imposed on fishermen and the issue therefore is a management issue not an industry issue. Fishermen agreed to follow the agenda laid out for the meetings but wished it to be known that the problems facing industry as regards bycatch and discard are imposed by regulators, not in general created by poor fishing practices.

Four *verbatim* excerpts from meeting transcripts are included here to underscore the importance of this issue. Identities of individuals have been removed and comments have been edited for brevity.

Comment recorded at the Manomet Meeting

"I've got listed two things here that really bother me about this whole way that we look at and evaluate the significance of bycatch and evaluate potential solutions to bycatch. My first is this, is that we have what I call "a command and control system," where somebody in authority makes a decision, and then people in the gear technology field have to scurry around and find remedies that this management dictate creates. And I give you two case studies.

Case Study One is the Gulf of Maine cod limit where the Council set a bycatch limit for cod to try to keep the fishery within a TAC. And immediately, as limits became more and more restrictive and invoked a firestorm of protests that we're discarding. You know, and we shouldn't be discarding. Now we're bad people because we're discarding.

And I argue that maybe we shouldn't be having to put out this brush fire because it was not one of the fishermen's making. It was an artifact of management. And there should be a feedback loop into this whole system where gear technologists say, Hey, look, we can develop a system that will weed out some codfish, i.e. a square mesh escape panel, you know, Luis Ribas' escape panel, but we can't necessarily get you down to zero cod from the catch. So let's be reasonable here and say, There's got to be some give and take in this.

The absurdity came when we were going progressively lower. We went from, in one year, 200 pounds to 100 pounds to 30 pounds of cod without any regard to gear selectivity hoping that would solve the problem. In my take, it just papered over the problem and turned economically valuable catch into an economically worthless discard with probably not much change in mortality.

Case Study Two is they give us a bunch of different-sized flatfish: We have a 12-inch with of flounder; We have a 13-inch yellow tail; We have a 14-inch dab and a 14-inch grey sole, and one mesh size, and say, Hey, you guys have a discard problem. Fix it. Well, you know, it's hard to fit different-sized fish through the same hole and get the same selection curve out of it. So that's beef one that I have with the system. There needs to be some reality check on some of the missions that they send us on in the first place.

Beef Number Two is I think there needs to be a better bycatch standard. Now, the hard and fast rule for exempted gear is 5 percent bycatch. If you have more than 5 percent bycatch you're bad; if you have less than 5 percent bycatch you're good. Well, you know, how do you measure this? Do you measure it tow by tow? So if you have one tow that's more than 5 percent, you fail and you're a dismal derelict as a gear technician. Or do you average out tows over time? And if so, how many tows? You know, well, that's never been published. So we do that by a case-by-case basis - I know that whole issue of the raised foot rope whiting trawl and its efficiency raised that as an issue. Secondly, regarding the 5 percent bycatch, 5 percent of what? Is it 5 percent of 100 tons of herring? Or is it 5 percent of 100 pounds of scallops that put you over the threshold of evildoer? You know, you could be 1 percent of a hundred tons of herring and kill more fish than you would if

you were 5 percent to a hundred pounds of scallop. So again, that whole definition needs to be refined and quantified in a better. So those are my two caveats.

All I did was throw this out before we began the discussion because it really colors where you go. I'm all for having a net that produces nothing but economically valuable catch. But I realize that that's difficult to do because we have not only regulatory discards, but economic discards to consider. But I just want a level playing field, you know. I just don't want to have to be spending huge amounts of resources and time, as we have had to do, solving problems that are created by management."

Comment Recorded at Point Judith

"..... if you want to give me 30 seconds or a minute, I might be of help. People are on different frequencies here. You're a gear technologist and a fish behavior specialist. The mindset of the leadership in the Agency -- to a certain extent all fishery management bodies, whether it's states, Atlantic States, or the Council, is addressing this problem of bycatch and discard thinking that it's purely one of gear selectivity. I think that one of the things that would be very useful if you looked at some of these issues and said wait a minute, this is not a gear selectivity issue, this is a political issue, either because the science is inadequate and therefore the trip limits and the quotas and the thresholds are incorrect, please don't try to solve this problem with gear selectivity. On the fluke issue there's a perfect example. Should we really be trying to teach New York and Connecticut fishermen to catch fewer fluke because their quotas are so low and because the system cheated them terribly? So, if in the process of asking the industry's cooperation on cleaner methods of fisheries, which we're happy to give, there also has to be a recognition that there are other bigger problems that can't be done with that. So, if you take the message back that I'm suggesting, hey leadership, you've got to look at other issues besides beating on commercial fishermen for bycatch and discards, because you're causing half of it."

Comment Recorded at Portland

" I have a little technicality of -- I've always had a little problem with the whole term of "bycatch." And that term in itself seems to lay all the blame on us. And I can show you record after record, most of the discards that we have now are regulatory discards. And so I think there's blame to be shared, so . . . I know that through the years of battling and battling with environmental groups and everything else, a slight term like this can turn the tide of general public perception. And while, most of us have tried to find ways to reduce bycatch, the whole term of regulatory discards can't be overlooked. And again, like it has been pointed out, we're catching -- we still catch some 13-inch grey sole that are a perfectly marketable product, but the law says 14. The law was made because that seemed like a good thing to do at the time, but not on biological terms."

Comment Recorded at Point Judith

" You just said something about sticking with the current management regime of National Marine Fisheries Service. If you're not willing to recognize that National Marine Fisheries Service and their opinions and the way they manage things now that they don't need a complete overhaul, then anything you do in my opinion is destined to failure, because most of the problems you have with discard issues involve the National Marine Fisheries. Sticking to the agenda - I find it very difficult to do that when the current agenda of the National Marine Fisheries Service is the major cause of most of the discards."

Summary of issues raised at meetings

As stated previously each meeting provided a vast array of information on a wide range of topics. We make no attempt to list each issue here, simply to summarize the outcome of the series of meetings. Summaries are based on the flipcharts prepared at each meeting (Appendix 1) and from the transcripts. The issues and concerns from all 10 meetings can be separated into 7 separate categories outlined in Tables 1 through 7. These categories can be defined as follows:

- Species of concern
- Bycatch and discard issues
- Separation by species
- Assessment of bycatch and discard levels
- Selectivity issues
- Mortality issues
- Other fisheries and management related issues

In the account that follows we have made no attempt to discuss every issue contained within the Tables. We have however, attempted to provide an overview of the salient points contained within each category.

Species of concern

For each port, Table 1 lists the species and broad categories that were raised in discussion. Some were raised at species specific level, others either generically (such as skate or squid) or at higher levels (for example, marine mammals). The number of ticks per box represents the number of different topics discussed for that particular species. Discussion of some species occurred repeatedly within a given meeting and across all meetings (dogfish). These clearly represent a common, region-wide, concern. Others were raised at only one meeting, for example, sea bass bycatch was an issue at Montauk, urchin bycatch in lobster fisheries was identified in Rockland, and mussels and mahogany clams were identified as issues at Ellsworth. These clearly fall into the category of issues of local concern. We make no attempt here to assess the overall importance of local or region-wide concerns, merely to illustrate the geographical range of concern for each species.

Bycatch and discard issues

At each meeting participants discussed bycatch and discard issues at length. Discussion ranged from the need to change bycatch regulations and/or management strategies, to identification of specific areas where conservation engineering techniques could be utilized to help reduce bycatch and discard. Here we report only on discussion of potential conservation engineering approaches to reducing bycatch. Other issues are reported under the heading, other fisheries and management related issues.

Table 2 outlines those species and fisheries identified in each port where participants felt research efforts should be made to reduce bycatch and discard. Where discussion was specific about either a fishery or particular aspect of bycatch and discard for that species, comments are included in parenthesis. For example, bycatch and discard of dogfish was raised in 8 out of 10 port meetings. At three of the ports (Manomet, Montauk

and Portsmouth) it was identified as a general issue. At one port (Gloucester) participants felt the issue of regulatory discard of dogfish should be addressed while participants at 4 other ports were more specific; hook, trawl and gillnet fisheries were identified at Hyannis, the groundfish fishery at Portland, the tuna bait fishery at Rockland and gillnet fisheries were identified by participants in Ellsworth. As with Table 1, multiple ticks represent the number of different discussions on a particular topic. Fuller details of discussions are outlined in Appendix 1.

Much of Table 2 is self-explanatory. It identifies species of major concern, provides a geographical context and should form the basis of encouraging research efforts to address each specific issue. As above, we make no attempt to assess absolute priorities.

However, there are a number of very obvious issues of concern. Examination of Tables 1 and 2 show that there are bycatch and discard concerns region wide concerning cod, dogfish, monkfish and to a lesser extent yellowtail flounder. Cod is obviously of concern in part due to the emergency rolling closure regulations but also due to reports of large aggregations of small fish in certain locations. It is fair to say that development of fishing gear that would allow fishing on other stocks, without catching cod, would alleviate many of these concerns. Dogfish is another apparently region wide concern. Dogfish appear as a bycatch in almost every gear type (sometimes in great numbers), have little or no market value, can cause damage to gear and can be time consuming to remove. In some cases appearance of dogfish can force fishermen to move to different areas or stop fishing altogether. Although this is likely to be a difficult task, industry would welcome development of bycatch reduction devices for dogfish. Similarly monkfish bycatch and discard has been identified as a topic of concern not only in scallop trawls but in other trawl fisheries as well. Monkfish is a valuable resource but fishing gears as currently designed are poor size selectors for monkfish. As with dogfish, development of size selective fishing gears that reduce discard of small monkfish is likely to be difficult but demands to be addressed.

By drawing attention to these region wide concerns does not imply the other issues outlined in Table 2 are lesser priorities. There were calls to reduce bycatch and discards of all the species included in this list and each is a valid and important concern.

Separation by species

Management of fish stocks is a complex science. At any point in time, some stocks may be in recovery, others in decline. Furthermore the relationship may vary both by location and season. For fishermen the result is uncertainty in the composition of catch and potential for unpredictable bycatch. One very specific subset of the field of conservation engineering is the potential to develop strategies for separation of fish species underwater. This is an area of considerable interest to the fishing industry. Strategies that allow fishermen to be species-specific would allow them to fish on target species while avoiding species of concern with respect to bycatch and discard.

Table 3 summarizes the separation issues raised at each meeting. Participants identified the need to develop strategies to separate cod from haddock, cod from any other fish, grey sole from American plaice, pollock from cod and haddock, striped bass from bluefish and weakfish and whiting and redfish from other groundfish. The other major category identified in 6 meetings was the need to develop sex-selective strategies or fishing practices for dogfish. This almost certainly reflects the peculiar management

regime for dogfish and may be one very specific case where aspects of bycatch and discards could be resolved by simple change in regulation. Nevertheless it is an issue of considerable importance that demands attention.

Assessment of bycatch and discard levels

At virtually every meeting, industry representatives called for more and better information on bycatch and discard levels. Some challenged the assertion that bycatch and discard were significant problems, others that information was incomplete at best and non-existent at worst. A number of fisheries were identified where no real baseline information existed and where a need for assessment of bycatch/discard levels was identified as an urgent requirement (see Table 4).

Selectivity issues

Discussion of selectivity of fishing gears formed a major component of each meeting. In general there were two main components of discussion,

- the need to assess the absolute selective efficiency of fishing gears currently in use
- the need to improve size and species selectivity in most fisheries

Table 5 summarizes the issues by port. Almost universally, there were calls for a coordinated program to identify selectivity parameters for all fishing gear types and to assess area and seasonal changes in selective efficiency. In addition, there was vigorous debate regarding the need to assess effectiveness of proposed gear changes in advance of changes in regulation. Industry members recognize that such a requirement could lead to long delay in implementation of say an increase in mesh size, but were strongly supportive of coordinated proactive-programs to assess selectivity of a wide range of mesh sizes and types.

Some very specific selective gear issues were identified at each meeting and are summarized in Table 5. However, a number of these specific issues should be highlighted simply because they seemed to rise above the more normal approach of further development of conventional methods. One suggestion involved shifting focus from the codend of trawl gears to identifying methods of modifying the front of the net to improve selectivity. Improving selectivity at the front of the net would have the added benefit of releasing fish much sooner in the capture process and therefore intuitively in better condition with a better likelihood of survival. Fishermen in Point Judith were particularly interested in this concept and strong calls were made to demonstrate how such a net could be made to operate. Other groups of fishermen called for development of lobster traps designed to select against large lobsters, one of the few comments from trap fishermen at any meeting. And finally, there was interest in investigating whether herring fisheries could be enhanced by utilizing acoustic herding techniques. Emphasis on these issues does not imply any prioritization merely that these displayed a degree of lateral or tangential thinking, components that have been shown to be important in development of novel and effective fishing gears.

Mortality issues

The issue of mortality was raised directly at four meetings but hinted at in many others (see Table 6). The issue of whether fish survive the discard process is fundamental to the whole process of developing more selective fishing gears. There is little point in developing more effective gears if the fish which are expelled do not survive. It is also clear that this is one particular area where basic information within the region is almost

non-existent. There is strong industry interest in ensuring that basic scientific studies be encouraged and that mortality or survivability information be more widely available. There is also interest in learning from survivability studies that have been conducted elsewhere and assessing the applicability of those studies to the New England region.

A separate aspect of mortality was raised at the Rockland meeting. There was a strong call to control fishing mortality rates in the Gulf of Maine. This is a management issue not a fishing issue but is nonetheless an important aspect of mortality within a fisheries context.

Other fisheries and management related issues

As stated elsewhere in this report, one of the most obvious themes of the series of meetings is that fishermen and the fishing industry are still greatly frustrated with fisheries management both at the Council level and with NMFS. This general disillusionment had a tendency to be expressed at every stage of meetings and had the effect of deflecting energy and attention from the main agenda items. In general, efforts were made to stick to the agenda but it appeared there was a clear need for these views to be expressed and documented. Comments that were not strictly related to agenda items were nonetheless documented and form an important part of this report. Table 7 outlines many of the more important or most regularly voiced comments. Two messages in particular were articulated at virtually every meeting.

The first and perhaps most strongly felt was the need for better more effective stock assessments. Fishermen believe that conventional stock assessments are flawed and that there are often more fish in the sea than the stock assessments would have them believe. In addition, there is a widely held belief that basic biological, behavioral and ecological information for our important commercial species is lacking or non-existent. This lack of basic information could greatly hinder future research initiatives and the industry highlighted the need to implement basic data gathering programs immediately.

Secondly, there was a universal feeling that the experimental permitting process must be revised. This issue beyond any other provoked universal sentiment. Fishermen see an apparent willingness at the highest level, to support cooperative research programs. They feel a deep sense of frustration when faced with seemingly interminable delays before knowing whether or not permits will be issued to allow the work to proceed. Industry representatives were also concerned that in order to gain the maximum benefit from the work, the research needs to be conducted at the appropriate time and place and on the appropriate distribution of fish. It serves no logical purpose to permit fishing where there are no fish or to postpone research through cumbersome bureaucracy. Additionally, there is strong sentiment against the requirement to use days at sea for scientific research programs. Fishermen believe they should not be penalized for conducting scientific research by loss of valuable commercial opportunity.

Furthermore, there is a perception within industry that the nature of permits (when issued) correlate to the abilities of the scientists/fishermen writing the application. More importantly, there is a feeling that lack of understanding of the process can lead to less favorable permits being issued. As an example, some feel they are pressured into use of days at sea for scientific programs while others are allowed to opt out of days at sea regulations for other research programs. The general feeling is that whatever system is in place should treat all equally. This thorny issue could be resolved by a simplification of the permit application process. This allied with formalization of information required on

the permit application and publication of clear guidelines governing the decision making process would alleviate much of the uncertainty and go a long way to streamlining the process.

It was emphasized many times that collaborative research is vital to the future of New England fish stocks. The clear message is that this may be one of the most significant hurdles to implementation of truly collaborative projects. One fisherman voiced his concern by imploring that we follow the Canadian example and issue permits where warranted in 6 not 60 days.

Other issues included calls to reinstate “the running clock”, allow fish transfer at sea as a means of reducing waste of the resource, implement real time monitoring of bycatch and discard levels in all fisheries, and redirect fishing effort to other economically viable fisheries (for example neon squid).

The narrative above summarizes the substance of the series of meetings. However, as with any meeting, there are often sub-plots or common issues that do not speak directly to the formal agenda but are nevertheless important within the context of assessing the real issues. In the narrative that follows we have attempted to document some of these issues we considered to be important, that were formulated either directly or implied during the course of meetings. We believe the true essence of the meetings would be lost without at least passing reference to these issues.

Habitat impact

At virtually every meeting concerns were expressed, often indirectly, regarding the issue of habitat impact. Surprisingly, these concerns were addressed at a number of different levels. Many felt that gear impact on habitat would become increasingly important and in the future could dictate where fishermen would be allowed to fish or, more importantly, not fish. Others focused on the need to quantify levels of impact and to demonstrate whether or not such impacts are significant.

In general, despite recent high-profile initiatives suggesting the contrary, participants felt that good quality information is truly lacking in this area. Consensus was that better information on physical habitat, bottom topography, oceanography and species distribution should be gathered as a matter of some importance. More specifically, there were calls to assess degree of impact in a wide variety of fisheries including scallop, urchin and mussel drags and in general to establish methods to lessen gear contact with the bottom in all fisheries.

In addition, some felt that industry should become proactive with this issue and publicize those developments that reduce habitat impact. Examples discussed include the raised footrope trawl and the sweepless raised footrope trawl, both of which allow target catches to be maintained but dramatically reduce contact with the sea-floor.

Education and outreach

There is a clear and pressing need for a program of education and outreach on conservation engineering techniques. If this series of meetings is to form the basis of future research and development programs then all interested parties should be aware of what work has been conducted elsewhere and more importantly to be aware of what works and what does not. Furthermore, there is an acknowledgement that collaborative programs involving both fishermen and scientists have the potential to create divisions

and suspicion between different groups. It is important that partners approach collaborative programs with common expectations and that scientists and fishermen make allowance for the specific needs of the other. This can only be achieved by dialogue and a willingness to approach situations with an open mind.

Alternative management strategies

Virtually every meeting explored the possibility of alternative management strategies. Fishermen do not like to discard fish and many participants felt that bycatch and discard could be removed altogether by changing the regulations that forced discarding. Others called for adoption of 100% retention strategies. Such strategies would provide better information for management purposes (everything that was caught would be accounted for) and would help reduce waste in fisheries region wide. *(Eds note; It is interesting to note that an initiative is currently underway, under the auspices of the ASFMC, to discuss potential methods to reduce the level of so-called regulatory discards.)* Many argued that by simply allowing fishermen to keep more of the fish they caught, fishing effort would actually decrease as fishermen would steam home once they made a days pay. Otherwise they would keep fishing and discarding until they made the level of catch required to make a living. Others highlighted the safety implications of this practice which encourages fishermen to stay on the water in marginal weather conditions instead of catching enough fish and steaming back to port.

Long term support and funding

Industry representatives acknowledged that collaborative research is vital to the future of the fishing industry. However, there are concerns that failure by major institutions to make long-term commitment to these programs would further damage relationships between industry and others. There is a clear sentiment that all parties should do their utmost to ensure continued funding and support for these programs.

With regard to funding of research there is an obvious dichotomy within industry. Some view recent funding as emergency relief while others see it as supporting scientific investigations to improve overall management of resources. Whatever the intent, all agree with the need to ensure funding for the future. Participants at the Manomet meeting explored what a model for future funding might look like. Consensus was that industry would like to move beyond so-called “disaster status” and try to develop funding sources that did not rely on governmental input. The conceptual model (see Appendix 1) envisions support coming from all sectors including NOAA/NMFS, industry, NGO’s, Foundations and the public. In addition, appropriate use of agency fees or industry levy’s could help fund particular programs as could, in some cases, TAC set-asides.

This is one particular area that would benefit from strategic long-term planning by a group of qualified interested parties. NMFS and industry representatives are to be encouraged to explore innovative funding strategies to maintain the impetus generated by initial collaborative research programs.

Vessel compensation

A current and recurring concern to those involved in collaborative research is the issue of vessel compensation. Daily compensation rates will vary with vessel, season and work demands. However, there is a need to devise compensation strategies that are widely accepted and which provide sensible and equitable treatment for all. This issue has potential to create divisions within both fishing and scientific communities and whatever strategies are devised should encourage industry participation but avoid unfair

advantages for some at the expense of others. This issue is of sufficient importance to the success of the entire collaborative research program that it warrants careful consideration by key industry, scientific and management parties.

Non-fishing-industry impacts

Some meetings, especially those in areas where substantial inshore fisheries exist (for example, Ellsworth, Point Judith, Portsmouth) identified the need to document and assess the degree of non-fishing-industry impacts on habitat and stocks. Pollutants originating from land-based, non-point sources (for example, run off from golf-courses, thermal discharge from power plants, chlorine) were considered to have major effects on recruitment and survivability of juvenile fish as well as affecting distribution and abundance of other organisms. Little attempt has been made to document the nature or extent of such processes although the effects are considered by many to be substantial. There is strong fishing industry support for initiating programs to identify and monitor such impacts.

An additional impact issue concerns recreational fisheries. At least two port meetings identified the need to assess the true nature of the impact of recreational fishing on fish stocks. There were calls to improve monitoring of recreational fisheries and to incorporate this information more effectively into stock assessment programs.

Timely use of data

Fishermen expressed the need for data from collaborative programs to be conducted in a timely fashion. The current time lag between data collection and utilization at the management level is one of the industries strongest criticisms of the scientific community. If collaborative research programs are to be truly successful there must be emphasis placed on making the data widely available and to encourage more timely incorporation into the decision making process at a management level. Fishermen should also be encouraged to be more closely involved in analysis of data and in particular the process of drawing conclusions.

Seize the opportunity

Finally, there is an overwhelming belief that we are all (fishermen, scientists and managers) at a crucial juncture. Many collaborative programs are currently in initial stages and there is a strong feeling of optimism. Most feel this is the beginning of a new age of fisheries research and management. However, there is a real and palpable fear that failure to make the most of this opportunity could have the reverse effect of that intended. The onus is firmly on the shoulders of those who want to make collaborative research successful to ensure that it is.

Specific recommendations

Recommendations and comments contained within previous sections of this report and outlined in Tables 1 through 7 reflect sentiments expressed during workshops. We believe the information contained within the Tables and the meeting summaries in Appendix 1 are a complete account of the specific comments offered during the series of meetings. There are clear common themes as well as site-specific local area concerns. Meetings had many similarities but each was also unique. Here we attempt to synthesize multiple ideas from multiple meetings and to provide an overview of the meetings as a whole. We have attempted to generate specific recommendations that may be of use in setting research priorities. We believe the recommendations are supported by the general discussions but are acutely cognizant of the changing nature of fish stocks. What is a problem today may not be a problem tomorrow. We are also aware of the pressures on fisheries managers and that management priorities can change rapidly. In this light we submit the following recommendations. The recommendations are not prioritized.

- Improve monitoring of bycatch/discard levels

In many cases, the true level of bycatch and discard within a fishery is poorly known. In some cases, bycatch is perceived by the public or managers to be a problem, but may not in fact exist. Before any systematic attempt can be made to reduce bycatch the true nature of the problem must be defined. There is also a need to ensure all studies split bycatch and discard by category. For example, regulatory discards are different from market based discarding practices and the fishing industry is firmly of the opinion that any discussion of bycatch and discard should draw attention to these differences. Definition of levels of bycatch and discard will help assess priorities and almost certainly help define management strategies. Additionally, better background information will allow scientists and fishermen to focus on the problem. Many bycatch reduction studies are reduced in effectiveness by resources being deflected towards quantifying bycatch and discard levels. If such information was available, energies could be devoted to developing new gears and or strategies that actually work.

- Implement **coordinated** programs to address bycatch/discard in key fisheries

Experience has shown that bycatch reduction devices tend not to be generally adopted into wide-scale industry use. Within the New England region there are at least three major exceptions to this argument (mesh size increases, the raised footrope trawl and the Nordmore grate) but many other promising developments have simply disappeared. In order to be truly successful in reducing bycatch and discard within the region, the approach should be systematic and coordinated and should address local area concerns as well as region wide big picture projects. This more than almost anything else would help to promote the process of collaborative research and would encourage buy-in by all sectors of industry. The systematic and coordinated approach should be based initially on the information outlined in Tables 1 through 7 but there should be periodic reassessment of bycatch issues region wide.

During the series of scoping meetings there was some exploration of creative approaches to specific issues but in general there was a surprising lack of futuristic thinking. Studies that demonstrate a radical approach to the subject of bycatch reduction should be encouraged. Most recent studies have focused on refinement of

existing gears and or technologies. Perhaps futuristic approaches may deliver a greater impact in the long term.

- Document reaction behavior of key species

An understanding of the behavior of fish to fishing gears is fundamental to development of bycatch reduction devices (BRD,s) and strategies. The few BRD,s that have been widely adopted in fisheries worldwide have been based on using differences in behavior between target and non-target animals. The Nordmore grid and raised footrope trawls are perfect examples of this. At present, very little information exists about the behavior patterns of key species within the region (for example, cod, yellowtail flounder, monkfish, dogfish, redfish). Systematic, coordinated studies of behavioral reactions to fishing gears should be encouraged.

- Address gear selectivity issues

Much of the information on the selectivity of fishing gears is extrapolated from historical studies on much smaller mesh sizes. There is a pressing need to implement systematic studies to assess the selectivity of currently used fishing gears of all types. Furthermore, selectivity is known to change with season. We recommend that seasonal aspects of selectivity of currently used fishing gears be addressed. There was also a strong message from industry representatives that there should be a proactive approach to selectivity studies and mesh sizes greater than those currently in use should be examined. From an industry perspective it is important that mesh size increases should not be implemented without proper investigation of the selectivity of the proposed configurations. Studies on selectivity should be encouraged to include economic analyses of gear changes.

- Implement studies to understand mortality of discards

Development of bycatch reduction strategies and devices is of little utility if fish expelled by such devices do not survive the process. There is strong interest within industry to address this issue. Studies that address survivability of fish discarded from **commercial** fishing operations should be implemented as a matter of some urgency. It is important that the focus should be on commercial operations as studies elsewhere have shown survivability values from research platforms are in some cases at odds with values obtained from fishing boats.

- Develop outreach and education programs coordinated with bycatch reduction research programs

Many potentially effective bycatch reduction strategies or devices have failed to gain acceptance. This is in part due to lack of understanding of the potential benefits such approaches can bring. A clear message came out from the series of meetings that there is a need for information to be made widely available. Without such programs of outreach and education, successes within the field of bycatch reduction will continue to be sporadic.